Lab #1

MAT 305

Spring 2016

1. Create a new worksheet. Set the title to, "Lab #1".
2. Create a text cell (shift+click on blue line). Write your name, and this semester. Change it to some color. You can choose any color you like, as long as it's not black. — Or white. White would be bad, too.
3. In the first computational cell, use the `var()` command to define variables x and h.
4. In the next few computational cells, have Sage expand the product $(x+h)^n$ for several values of n. The `expand()` command was shown in the notes, and you should pick several sequential values of n.
5. In a text cell that follows these computational cells, make a conjecture as to what the last two terms of $(x+h)^n$ will always be, and what common factor the remaining terms always have.
6. In Calculus, you are told that

   - the definition of $\frac{d}{dx}f(x)$ is
   $$\lim_{h\to 0}\frac{f(x+h)-f(x)}{h},$$
   - and $\frac{d}{dx}x^n = nx^{n-1}$.

   In a final text cell, explain why your answers to steps 4 and 5 demonstrate this fact.